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in some form or other. Observations on the habits of such species are yet to be made.

In conclusion I wish to place on record an observation on *Megarhinus septentrionalis* D. & K., our largest mosquito. On July 14 of this year I found a female of this species at Glen Carlyn, Va., probing for honey upon a cyme of *Hydrangea arborescens* L. The mosquitoes of the genus *Megarhinus* are so rare that very little is known of their habits, but it appears quite certain that they do not attack animals, indeed, their proboscis is unfit for piercing the skin. Probably they feed wholly upon the nectar of flowers, but as they are very rare, even in their proper home—the tropics, and withal very shy, it is not strange that they have escaped observation.

Class I, HEXAPODA.

Order V, LEPIDOPTERA.

THE LIFE HISTORIES OF THE NEW YORK SLUG-CATERPILLARS. — XIX.

BY HARRISON G. DYAR, PH.D.,

WASHINGTON, D. C.

The series of papers under this title ceased in 1899 with the description of *Natada nasoni* Grt., and a concluding general account was given. I am now enabled to add another life history of a species found in New York state, at least occasionally, as Mr. Joutel has taken the larvæ on Staten Island.

Isochates beutenmuelleri Hy. Edw.

1887 — *Limacodes beutenmuelleri* HY. EDWARDS, Can. Ent., xix, 145.

1892 — *Semyra beutenmuelleri* KIRBY, Cat. Lep. Het., i, 534.

1894 — *Semyra beutenmuelleri* NEUMOESEN & DYAR, Journ. N. Y. Ent. Soc., ii, 71.

1895 — *Phobetron beutenmuelleri* DYAR, Can. Ent., xxvii, 245.

1899 — *Isochates beutenmuelleri* DYAR, Journ. N. Y. Ent. Soc., vii, 208.

1902 — *Isochates beutenmülleri* DYAR, Bull. 52, U. S. Nat. Mus., 356, no. 4090.

1905 — *Isochates beutenmuelleri* DYAR, Proc. U. S. Nat. Mus., xxix, 387.

LARVA.

1878 — GLOVER, Ill. No. Am. Ent., pl. 11, fig. 1; pl. 20, fig. 40 (no name).

1899 — DYAR, Proc. Ent. Soc. Wash., iv, 300 (larva no. 2).

1899 — DYAR, Journ. N. Y. Ent. Soc., vii, 209, 236.

1902 — JOUTEL, Journ. N. Y. Ent. Soc., ix, 190.

SPECIAL STRUCTURAL CHARACTERS.

Outline elliptical, exclusive of the appendages ; dorsal space even, broad flat ; lateral space broad, subventral moderate, not retracted, the spaces continuous, not separated by ridges, which are indicated by the changes in direction of slope of the spaces. Tubercles greatly modified as in *Phobetron pithecium*, the first stage also as in that species, single everted spines with the basal half thickened, all alike. Tubercle iii of joint 5 is absent. There result three warts on joints 3 and 4, one on joint 5, and two each on joints 6 to 13, though only a trace of the lower one of joint 13 remains. The warts are produced into fleshy appendages, which are easily detachable, and deciduous at maturity. They are capable of regeneration in the earlier stages. Those of joint 3, the two lower of 4 and all the abdominal lateral row are small, conical, contracted at base and bear but few hairs toward the tip. The subdorsals of joints 4 to 12 are much more highly modified. They are applied by very broad bases, though the actual attachment is small, and cover nearly all of the dorsal and upper half of the lateral spaces, the fringing hairs finally obscuring the sides and lateral hairs from view. The terminal horn, bearing seta ii, is long and slender ; at its base is a prominent circular bulb which bears seta i at its outer side ; finally in the dorsal space is a pair of sparsely haired processes for each horn and another such in the lateral space, which appear to function as supporting structures. They are basal prolongations of the appendages. The warts bear at first stiff, smooth, pale setæ. Gradually these become converted into a series of fine feathered hairs, smooth at base and banded with black pigment, which replaced the smooth hairs nearly entirely, covering the larva with a dense fluffy coat, partially obscuring all the structures and giving the general appearance of a green hairy disk. The skin is covered with a sparse coating of colorless hairs from rather large clear tubercles. Depressed spaces imperceptible. The skin is very thick and transparent, which gives a glassy appearance to the larva ; the centers of the horns appear as small green cores in a tube of glass and the basal forks of the subdorsal horns are especially bright and shining. In the first stage the tubercles are represented by single long spines of equal length throughout, the subdorsals of joints 5, 7, 9 and 11 only differentiated by a slight difference in direction of slope. In the immediately following stages the subdorsal appendages of joints 7, 9 and 11 are much shorter than the others, exactly as in *Phobetron pithecium*, but toward maturity all

the appendages become equally long. The laterals of these segments are also slightly shorter than the other laterals.

These segments, 5, 7, 9 and 11 seem to be "weak" segments, like joint 11 in *Acronycta*, which Dr. Chapman has described. The weakness is shown, in the *Phobetron* group of species, on joint 5 by the absence of the lateral horn; on 7, 9 and 11 by the alternation of the setæ in stage I and the shortness of the horns on those segments subsequently.

AFFINITIES, HABITS, ETC.

The larva is closely allied to *Phobetron pithecium* Sm. & Abb., and to *Alarodia slossoniæ* Pack. In color, the equal length of the horns, and less closely in the hair structure it is nearest *slossoniæ*; but in the number of the horns and their arrangement and the narrowness of the dorsal space it is identical with *pithecium*. The adults, too, present a sexual dimorphism, and are somewhat similarly colored to *pithecium*, to which on the whole, it is most nearly allied. In this species the subdorsals of joints 4 to 11 only are functional, while in *slossoniæ* those of 3 to 12 are so and the side horns are much more completely suppressed than in *beutenmuelleri* and *pithecium*. *Beutenmuelleri* is structurally congeneric with *pithecium*. Its adaptation is different; being glass-green with whitish fluffy hair, and this probably necessitates the equal length of the horns. Otherwise the larvæ differ but slightly. The lateral horns are longer and slenderer than in *pithecium*, and their hairy coating has more degenerated. The subdorsals have the basal bulbs circular and prominent, not flattened-cordate, and their dorsal forks are slenderer and interlace on the back. The hairs remain long and less specialized than in *pithecium*. The horns are more readily detachable. In *slossoniæ* the horns remain attached throughout life and are found within the cocoon; in *pithecium*, they are shed spontaneously at the time of spinning, and are found attached to the outside of the cocoon; but in *beutenmuelleri* they are shed in a mass as soon as the larva has ceased feeding and before it leaves the tree to seek a place to undergo its transformations. During life, a slight touch serves to detach the horns, which are nevertheless not deciduous at moulting.

The species ranges along the coastal region to the foot of the Appalachians, from northern Florida to southern New York. It should occur on Long Island, though I have not found it there. It probably ranges along the Gulf coast to Texas, although all records are lacking,

and perhaps in the Mississippi valley west as far as the forests extend. The species is single brooded, the adults emerging during July, the larvæ maturing in September and October. There is no special food plant, any smooth-leaved tree in the right location will serve. The usual trees inhabited by Limacodids are chosen, the small-leaved red oak being the favorite. Location is more important than the particular tree, the larvæ preferring overhanging boughs without close undergrowth, generally about five feet from the ground, never low down. On large trees they may occur at a considerable altitude. The eggs are laid singly and generally well scattered, seldom many larvæ occurring on one tree, usually but one. They are placed on the back of the leaf, not adjacent to a rib. The young larvæ at first eat little holes through the lower epidermis and parenchyma and travel about a good deal, especially between the stages, although of course never leaving the original tree. Later they eat the whole leaf from the end, as is the general habit of the family. The larva, after shedding its horns, leaves the tree and spins a small hard round cocoon on the ground, where the winter is passed.

CRITICISM OF PREVIOUS DESCRIPTIONS.

The larva was figured by Glover nine years before the adult was known. I have commented on his figures, in which the bulbs of the subdorsal horns were interpreted by me as the horns themselves and the horns as laterals, owing to a wrong appearance given by the figures. I have also quoted the notes on the larva preserved in the Department of Agriculture, written, I think, by Mr. Pergande, in which an attempt is made to describe the peculiar structure of the tubercles, which is really scarcely understandable when taken alone, without comparison with allied forms. A good idea of the beautiful appearance of this insect is given in the account. I sent formerly photographs of the mature larva to Mr. A. R. Grote, who exhibited them before the entomological society at Hildesheim. He reported that the society was struck dumb, having never imagined that a larva could have such a strange and beautiful appearance. "The creature, as it moves, seems to be one mass of delicate floss of finely spun glass," as described in the Agriculture notes, to which may be added that the spun glass rests upon a series of clear green cones with a row of beads at their bases.

DESCRIPTION OF THE SEVERAL STAGES IN DETAIL.

Egg. — Elliptical, flat; shell white, evidently colorless and transparent, shining like a drop of water as usual; reticulations faint, angular. Size, 1.4×1.1 mm. (Chain Bridge, Va.); 1.1×1.0 mm. (Tryon, N. C.).

Stage I. — Elliptical, somewhat flattened dorsally, the anterior end thickened, tail slightly tapering; all smooth shining translucent whitish, the food giving a green tint. Head small, white, concealed in joint 2. Spines long, tapered, single, with a false central joint, three rows on the thorax, two on the abdomen (except joint 5), as in *Phobetron pithecium*; colorless, whitish. The alternate ones on joints 7, 9 and 11 of the subdorsal row lean outward. Lateral row equally long and alike, uniform. The subdorsal ridge is a little more opaquely whitish than the rest. Length, 1 to 1.6 mm.

Stage II. — Elliptical, thick, flattened; subdorsal horns thickly conical, short, placed around the subdorsal margin, of about equal length except three pairs, which are very short and the posterior pair, which is intermediate. There are three long horns before, then three short ones, alternating with two long ones, and last the intermediate posterior pair. Bases of horns roundedly thickened, leaving a narrow dorsal groove. All sparsely covered with short, pale hairs. Lateral horns minute, concealed. Translucent whitish green, like glass. Head whitish, within the hood of joint 2. Length, 1.4 to 2.4 mm.

Stage III. — Elliptical, flattened; dorsal space narrow, groove-like between the bases of the horns; lateral and subventral spaces also small, mostly occupied by the large bases of the subdorsal horns; these are situated on joints 4 to 12, long, blunt, and rather thick, a little tapering and projecting laterally, parallel to the leaf and not far above it, of equal length except the fourth, sixth and eighth pairs which are about two thirds the length of the others. Horns of joint 3, the lateral ones the whole length and the subdorsal of 13 short, shaped like the subdorsal ones but about one eighth their length and obscured from dorsal view. The subdorsals have at the base above a round, button-like prominence, distinctly constricted off from the horn and as high as wide. Hairs moderately numerous, on all the horns, short, stiff, colorless, with tubercular bases. Color green, mostly in the tips of the horns. The skin is thick and transparent, the pigment forming a small green core in the horns. Skin with sparse fine clear granules. There are only smooth setæ on the horns except the terminal primary ones (ii) which are more slender and have a truncate conical base. The subdorsal horns have a small cordate base dorsal of the rounded knob. Skin glassy, shining. Length 2.4 to 3.7 mm. (Tryon, N. C.); to 2.9 mm. (Rosslyn, Va., No. 1); to 3.2 mm. (Rosslyn, Va., No. 2); to 3.8 mm. (Chain Bridge, Va.).

Stage IV. — Subdorsal horns all long and equal (Rosslyn, Va., No. 3) or those of joints 7, 9 and 11 still shorter than the others, about three fourths their length (Rosslyn, Va., No. 1); otherwise the same in shape and color. There are three horns on joint 3, the upper one quite long, but subordinate to the others of the subdorsal row and without the basal button, the middle one small, the lower very small. Three horns on joint 4, the upper a functional horn, the others in a pair below it. Subdorsals of joints 5–12 equal to the subdorsal of 4 and very nearly uniform; subdorsal of 13 quite small, subordinated. Laterals of joints 6 to 12 small, but all haired like the subdorsals. Basal buttons hemispherical with the same clear spiny hairs. Skin finely setose-granular. Color green from the horn-cores as before.

The hairs on the bases of the bulbs and horns are simple, but a few of those towards the tips are lengthened out and spinulose as in *Alarodia slossoniae*. The dorsal groove appears darker than the rest. During the stage, the horns in the second example (Rosslyn, Va., No. 1) became all the same length, the short ones growing out. Length, 2.9 to 5.1 mm. (Rosslyn, No. 1); 3.2 to 4.4 mm. (Rosslyn, No. 2); to 4.6 mm. (Rosslyn, No. 3); 3.8 to 5 mm. (Chain Bridge).

Stage V. — Flattened elliptical, the radiating horns forming a flat disk; dorsal groove narrow, edged by the round bulbs of the horns of joints 4 to 11, the horn of joint 12 small. Horns nearly equal, those of joints 4 to 6 a little shorter, especially in front, gradually becoming longer posteriorly. Green, especially the outer two thirds of the horns, the body more whitish; dorsal groove darker. Hairs more numerous than before, all simple on the basal bulbs but of different lengths, shorter around the bases of the horns; at the ends of the subdorsal horns many of the hairs are lengthened and finely feathery spinulose beyond the base, forming a fringe that fills up the space between the horns, the whole composing a flat disk and touching the leaf. Side horns all obscured. Skin setose-granular as before. The basal fork of the subdorsal horns is small and obscure, dominated by the large, nearly spherical bulb that corresponds to tubercle i. The green color is very like that of the leaf. Length, 4.6 to 6.3 mm. (Rosslyn, No. 3); 5 to 5.2 mm. (Chain Bridge); 5.1 to 7 mm. (Rosslyn, No. 1).

Stage VI. — Shape and appearance the same. The dorsal groove is very narrow, the forked bases of the subdorsal horns almost touching, the two rows of nine bulbs separated by about their own width, except those of joints 4 and 12, which touch. Horns of joints 4 to 12 moderately long, horizontal, alike, the anterior ones only a little shorter. Whitish green, the distal part of the horns brighter green. Hairs on the bulbs all simple with enlarged bases, numerous; terminal primitive seta of the long horn simple, all the fringe-hair finely barbed beyond the base; many of the short hairs on the dorsal aspect of the horn have the distal half densely feathered. Head round, green, about .8 mm. wide. Skin granules small, remote, bearing rather long pale setae. Length, 5.2 to 7.5 mm. (Chain Bridge); 6.3 to 8.2 mm. (Rosslyn, No. 3); 7 to 9.5 mm. (Rosslyn, No. 1).

Stage VII. — As before. All bright green, shining under the hairs, so as to be a pale, glassy color, only the very tips of the long horns yellowish green. Horns flat, spreading longitudinally, the whole larva very flat, its dorsal groove narrow and edged by the circular knobs as before. Anterior pair of subdorsal horns (joint 4) rather shorter and a little curved backward; the last pair (joint 12) also rather shorter. Hairs fine, white, rather long, crossing from the adjacent horns and fringing the larva all around. Most of the marginal hairs are long and spinulose, some of those on the dorsal aspect and now also around the edges of the knobs. Hairs nearly all of the feathered type, at least in part. Nearly all are partly reduced in length, the tip being slender and weak, the shaft a little thickened centrally with a black band before the thickening. Even the fringe hairs are so and especially those on the edges of the bulbs. All the hairs seem to be essentially so modified, though those on the tops of the bulbs are still primitive, but they are black banded, and grade off into the ones on the sides. Dorsal furcate roots of the horns long and slender, touching sideways in pairs and joining across the dorsum, nearly smooth at base, the small area of skin left, sparsely granular. Seta i on a long clear conical

base with some smooth slender hairs around seta ii without accompanying hairs. The side horns are slender, over one third the length of the long subdorsal, with a terminal tubercle bearing iii and a number of rather slender transparent hairs, some of which, towards the tips are slightly short-spinulose. No pigmented areas. In certain views, part of the side horns are visible from the dorsal aspect between the long ones, but only with care. Length, 7.5 to 11.5 mm. (Chain Bridge); 8.2 to 11 mm. (Rosslyn, No. 3); 9.5 to 12.5 mm. (Rosslyn, No. 1); to 12 mm. (Tryon, N. C.).

Stage VIII. — Markedly different by the great increase in the number of hairs. So dense as to almost completely obscure the structure. The top is even and flat, many of the hairs directed straight upward, the whole resembling a fluffy disk with even, broadly elliptical outline. Shape and structure essentially as before, but the long horns are flexible and their tips bend backward or downward. Hairs nearly all of the black-banded, white-feathered-tip type, except some long ones about the ends of the long horns which are white, more slender, scarcely feathered and resemble those that still persist about tubercle i. The hairs from the bulbs rise nearly erect and all meet to conceal the dorsal groove. The surface is formed by the ends of the hairs, consequently the bulbs themselves do not show in front or side view any longer, and the outlines of the horns are obscured by the overlapping of the fringe hairs. No shortened or aborted hairs, *i. e.*, not more so than the usual feathered hair is so. Green, whitish, somewhat opaque, glassy translucent; the hairs look all white, the black bands do not alter the appearance as the white feathered tips are prominent, only seen with a lens. Head green, the eyes, labrum and a mark each side brown. The horns on joint 12 are shorter than those on joint 11, so the disk is truncate behind; horns of joints 4-5 are more proportionate but shortened.

Later the larva became thicker, 6 mm. high, whiter and more glassy shining. It is quite thick, the horns drooping to the leaf. The horns are slender, and from side view the lateral horns are visible through the haze of hairs. Bulbs circular from top view, higher than wide. There are furcate bases on the sides of the subdorsal horns reaching to the holes that represent depressed spaces (4). These forks, both in the dorsal and lateral spaces are the most glassy part of the larva. Side horns on joints 6 to 12 slender, equal, sparsely haired above and toward tip (as those of joints 3 and 4 are all over), but below with dense white hairs that cover the spiracles. Spiracle of joint 5 high up; spiracles brown, round. Length, 11 to 15.5 mm. (Rosslyn, No. 3); 11.5 to 15.5 mm. (Chain Bridge); 12.5 to 17.5 mm. (Rosslyn, No. 1); 12 to 16 mm. (Tryon, N. C.).

On reaching maturity the larvæ shed the long subdorsal horns and entered the ground to spin.

Cocoon. — Subspherical, hard, dark brown, with a round concealed lid at one end, as usual.

Pupa. — Formed in the Spring, after the hibernation of the larva. Thin-skinned, pale colored, emerging from the lid of the cocoon, as usual in the family.

EXPLANATION OF PLATE II.

1. Larva, stage II, dorsal view.
2. Larva, stage III.
3. Larva, stage IV.

4. Larva, stage IV, at end of stage, showing the side horns.
5. Mature larva.
6. One of the deciduous subdorsal horns, lateral view, showing attachments.
7. Hairs at tip of the horn, stage IV, enlarged, showing primary seta ii.
8. Hairs on the outer side of the bulb, showing primary seta i to be differentiated from the secondary hairs.
9. Hairs on the bulb, stage V, showing the beginning of the plumose setæ.
10. A plumose seta, further enlarged, showing the black pigment band.
11. Bulbs and dorsal space, two segments to show the projection of the horn-attachments into the dorsal space.

NEW AMERICAN LEPIDOPTERA.

BY HARRISON G. DYAR,

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Family SYNTOMIDÆ.

***Cosmosoma myrodora*, new species.**

Head shining blue; thorax red, the tegulæ with two blue spots; patagia lined with black, with a blue spot at the base of the wing; palpi black, red at the base; abdomen red, a dorsal black band beginning on the second segment and widening posteriorly, containing a row of metallic blue spots, the last three segments wholly black; venter black, the wool under the ventral valve of the ♂ white; legs red, the middle femora blackish without; antennæ black with white tips. Wings hyaline, the veins and margins black, the band widening at apex of fore wings. Expanse, 34 mm.

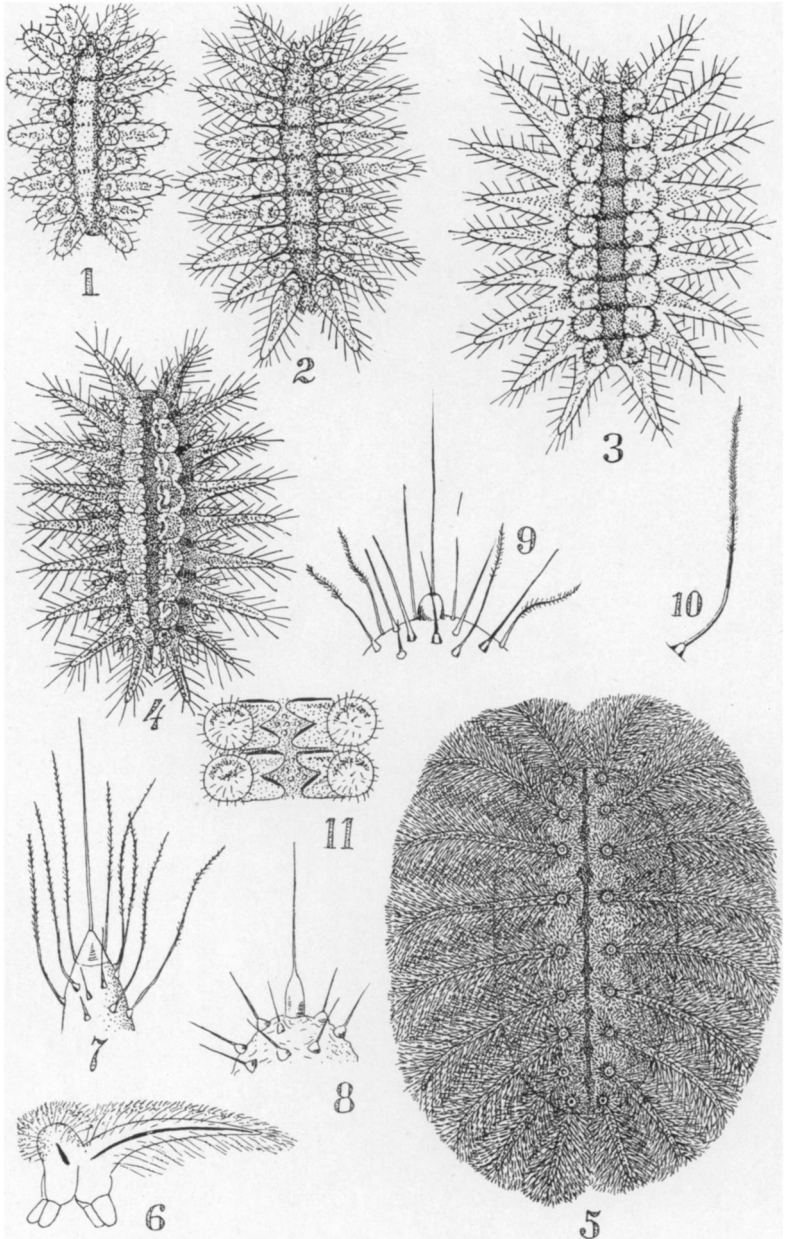
East coast of Florida; Indian River (C. V. Riley coll.), Palm Beach (Dyar), Miami (Schaus coll.).

Type. — No. 10739, U. S. National Museum.

This species has been known as *Cosmosoma omphale* Hübn. and *Cosmosoma auge* L., but it differs from the species bearing those names in the extent of the black band, which begins on the second abdominal segment and does not touch the thorax.

***Syntomeida jucundissima*, new variety.**

The form of *Syntomeida epilais* occurring in southern Florida differs from its Mexican and central American representative in the greener tint of the wings, the reduction of the white markings, the wing spots being smaller and the markings on the feet less, and in the different color of the terminal abdominal segments, which are scarlet in the Floridian form, crimson in the Mexican one. The above new name is proposed for the Floridian subspecies.



New York Slug-Caterpillars, XIX.